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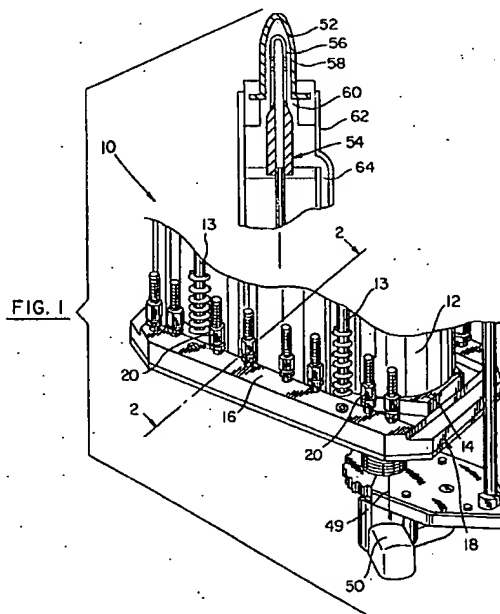
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(54) Plunger mechanism for I.S. machine.

(57) A plunger mechanism assembly where cooling air to and hot exhaust air from the plunger passes through the base plate which supports the mechanism. The hot and cool air is horizontally separated in a laminated base and insulated one from the other by a plate of heat resistant material.



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In the press and blow process carried out in an individual section of an I.S. machine, a plunger which is a part of a plunger mechanism is forced into a gob of molten glass contained within a blank mold to form a parison and the parison is then transferred to a finish mold where it is blown into a bottle or the like.

Cooling air is supplied to the interior of the plunger and the hot air exhausted from the plunger is passed through the lower cylinder portion of the plunger mechanism through the base plate exhaust cavity and into the foot which supports the plunger mechanism.

A conventional solution to this problem is to vent the exhaust into the frame without passing it through the lower cylinder portion but this solution has some undesirable side effects.

It is accordingly an object of the present invention to vent the exhaust through the lower cylinder portion without heating it up.

The present invention provides a plunger mechanism assembly comprising

a plunger mechanism including lower cylinder means for supporting a plunger for selected displacement, each of said lower cylinder means having a cooling air conduit for receiving cooling air and an exhaust conduit for exhausting hot air,

base plate means including

a lower plate having a bottom opening and an exhaust cavity including a plurality of horizontal conduits for directing hot exhaust air from locations horizontally spaced from said bottom opening to said bottom opening,

an upper plate having a plurality of top openings and cooling air conduit means for directing cooling air from a location horizontally spaced from said top openings to said top openings and

an intermediate plate of heat resistant material which is a poor conductor of heat intermediate said upper and lower plates for insulating said upper plate from said lower plate, and

through hole means defined in said upper and intermediate plates interconnecting each of said exhaust conduits with a corresponding horizontal conduit of said exhaust cavity.

Other objects and advantages of the present invention will become apparent from the following portion of this specification and from the accompanying drawings which illustrates in accordance with the mandate of the patent statutes a presently preferred embodiment incorporating the principles of the invention.

Referring the drawings:

Figure 1 is an oblique view of a portion of a plunger mechanism vertically separated from the plunger foot; and

Figure 2 is a cross-sectional view of the plunger mechanism base taken at 2-2 of figure 1; and

Figure 3 is a top view of a lower base plate shown

in Figure 2.

The plunger mechanism 10 has a lower cylinder portion 12 which is secured by tie rods 13 (only one shown) to the recessed portion 14 of the top surface 16 of the base plate assembly 18. Also connected to the top surface 16 is plunger piping 20 which supplies cooling air to the plunger mechanism via cooling air passages 22 (Figure 2) within the base plate assembly and top openings 23. Cooling air will pass through conduits 24 in the plunger mechanism to the plungers 52 via telescoping piping 54 which delivers cooling air to bleeder tube 56 located within the plunger 52. Cooling air passes through tube holes 58 to cool the plunger and hot air exhausted from the plungers will pass through passageways 60 between the plunger and telescoping tubing 54, through the interior of the upper cylinder 62 and through a conduit 64 defined in the lower cylinder 12 which communicates with exhaust conduits 26. (For purposes of clarity, only one plunger is shown. For complete details see U.S. Patent No. 4,836,839). The location of the exhaust conduits (here four, for a triple gob configuration) relative to the lower base plate is shown in dotted lines in Figure 3.

The base plate assembly is made up of upper 30 and lower 32 base plates made from cast iron which effectively conducts heat and an intermediate base plate 34 made from heat resistant material such as stainless steel which is a poor conductor of heat and acts as an insulator. The upper surface 33 of the intermediate plate 34 forms the cooling air conduit 22 with a channel 38 defined in the bottom of the upper plate 30 and the lower surface 39 of the intermediate plate forms an exhaust cavity 40 with an "X" shaped cut out 42 (Figure 3) in the top of the lower plate 32. A through hole 44 extending through the upper and intermediate plates connects each exhaust conduit to the associated end portion of the "X" shaped cut out 42. The "X" shaped cut out 42 is configured to minimize turbulence and hence to speed up flow through the base plate assembly thereby minimizing heat transfer at the through hole 44 to the upper plate 30. The exhaust cavity communicates, via an opening 46 in the bottom of the lower plate, with an air conduit 49 in the foot 50 which supports the base plate assembly.

Claims

1. A plunger mechanism assembly comprising
 - a plunger mechanism including lower cylinder means (12) for supporting a plunger (52) for selected displacement, each of said lower cylinder means having a cooling air conduit (24) for receiving cooling air and an exhaust conduit (26) for exhausting hot air,
 - base plate means including
 - a lower plate (32) having a bottom opening

(46) and an exhaust cavity (40) including a plurality of horizontal conduits for directing hot exhaust air from locations horizontally spaced from said bottom opening to said bottom opening,

an upper plate (30) having a plurality of top openings (23) and cooling air conduit means (22) for directing cooling air from a location horizontally spaced from said top openings to said top openings and

an intermediate plate (34) of heat resistant material which is a poor conductor of heat intermediate said upper and lower plates for insulating said upper plate from said lower plate, and

through hole means (44) defined in said upper and intermediate plates interconnecting each of said exhaust conduits with a corresponding horizontal conduit of said exhaust cavity.

2. A plunger mechanism according to claim 1, wherein said intermediate plate is made from stainless steel.

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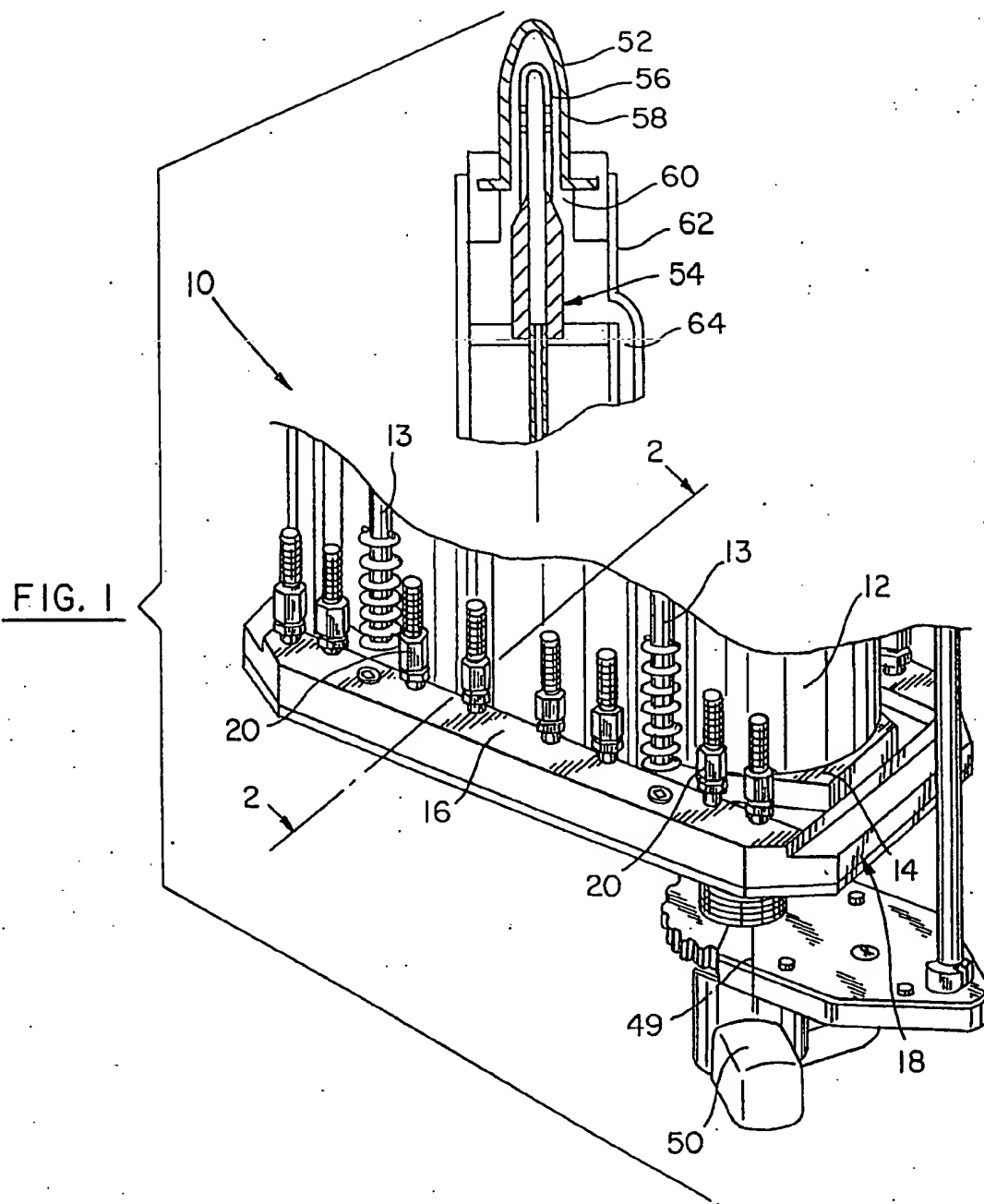
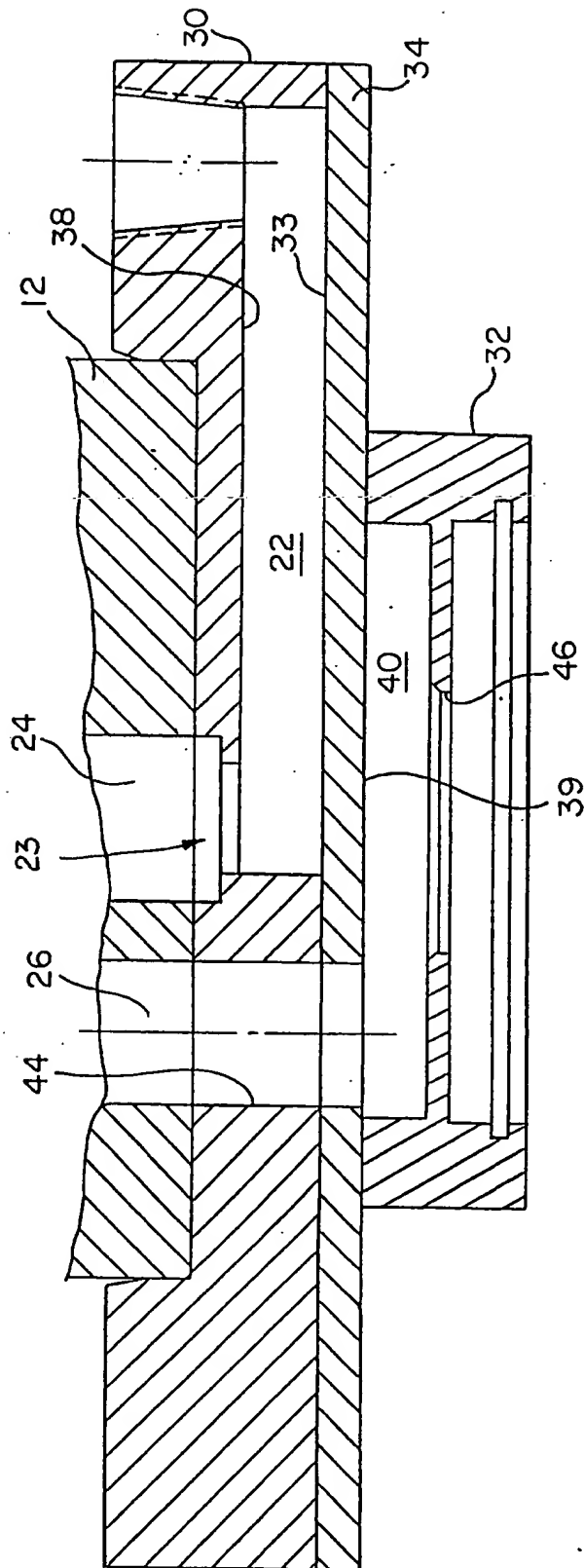


FIG. 2



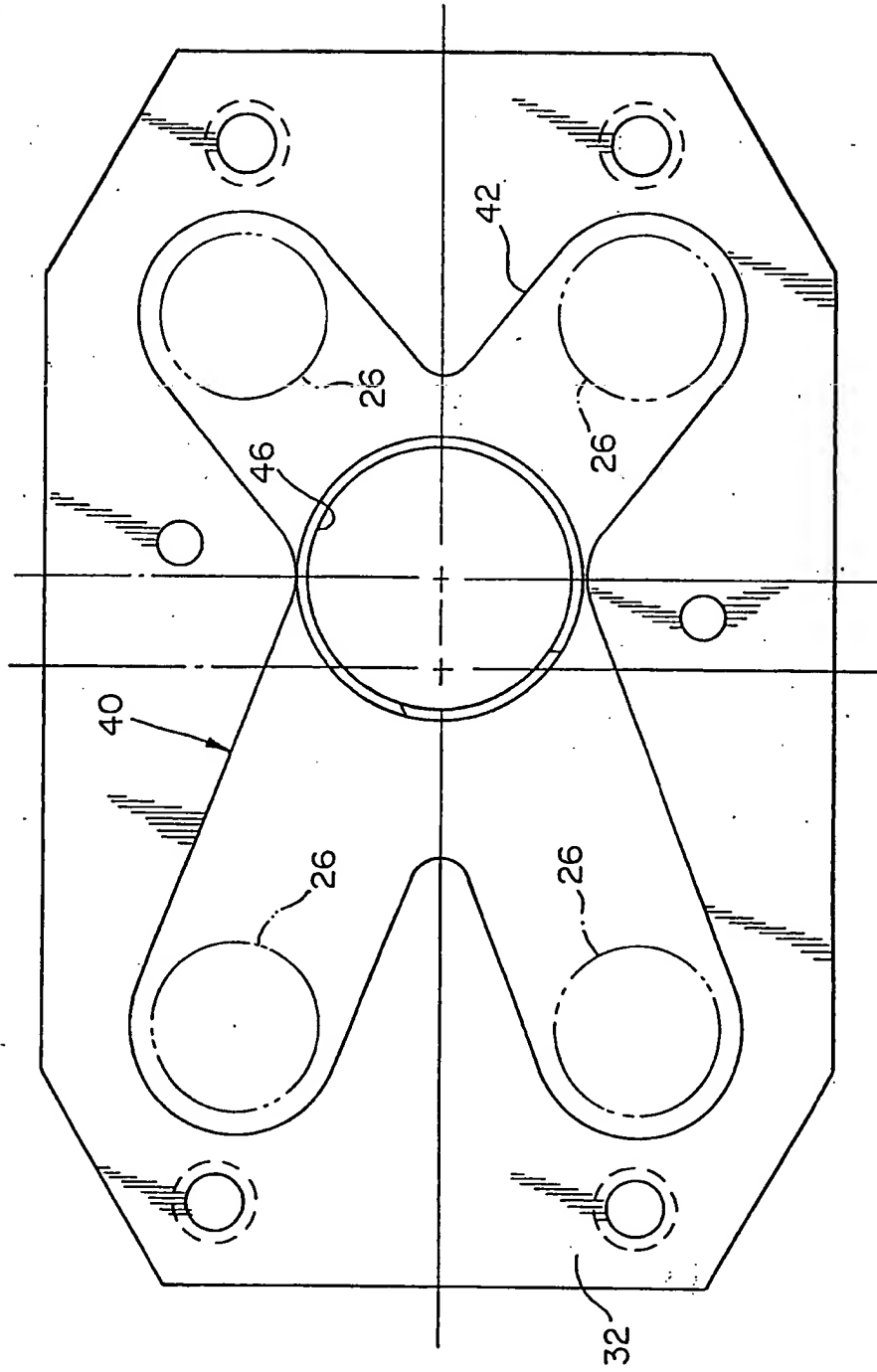


FIG. 3